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UNITED STATES DEPARTMENT OF AGRICULTURE  
Agricultural Research Service  
Washington Utilization Research Branch  
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The Contribution to the Outlook for Dairy Products Made by

UTILIZATION AND NEW PRODUCT RESEARCH

Objectives of Research on Utilization of Milk

Overall objective - to increase consumption of dairy products through improvement of products, development of new products, and decreased costs of processing.

Most pressing present objective - to develop a concentrated form of milk that can be stored and transported without deterioration and can be reconstituted to a product closely resembling fresh milk in appearance and flavor.

Some Results of U.S.D.A. Research Available to the Dairy Industry

Rapid process for Cheddar cheese  
Food product from whey protein  
Dry honey-milk product for baked goods  
Improved methods for measuring the fat and solids of milk

Current Opportunities for Increased Utilization

Easily dispersible non-caking nonfat dry milk  
Low-Butterfat spreads  
Whole-milk cheese  
Cottage cheese  
Concentrated milk



Prepared for the National Outlook Conference, Dairy Work Session, October 29, 1954 by: The Dairy Products Section, Washington Utilization Research Branch, Agricultural Research Service, United States Department of Agriculture



## Objectives of Research on the Utilization of Milk

The overall objective of research on utilization of milk is an increase in the consumption of dairy products through improvement of products, development of new products, and decrease in costs of processing. The uneven quality of some of our domestic dairy products is considered largely responsible for low consumption levels and for preference for imported products. Improvements in methods of processing are needed that will produce consistently high-grade products. New dairy products that do not merely displace other dairy products are a means of increasing consumption. Simplifying manufacturing procedures and replacing hand labor with mechanical handling are some of the ways by which production costs can be decreased, thus making possible lower prices for products and hence stimulating increased consumption.

The most pressing present objective is the production of a concentrated form of milk that can be stored and transported without deterioration and can be easily reconstituted in the kitchen to give a product closely resembling fresh milk in flavor and physical appearance. Such a concentrate would find wide use in areas in the United States where fresh milk is difficult to obtain or costly and would be a practical form to supply to our armed forces in the field and to foreign countries having inadequate domestic supplies of milk. The possibilities for attaining this objective lie in improving evaporated, condensed, dried and frozen concentrated milk. None of these meets all of these requirements at present. Research is being conducted on all types with the expectation that one or more can be improved sufficiently to satisfy the requirements of the objective.

### Some Results of U.S.D.A. Research Available to the Dairy Industry

A process has been developed for making Cheddar cheese in half the time formerly required, hand labor being largely replaced by mechanical handling. The laborious and time-consuming packing, cheddaring and milling of the cheese curd have been replaced by mechanical stirring and pumping of the mixture of curd and whey, and the curd is even put into the hoops mechanically. The procedures for making cheese of other varieties can probably be shortened in a similar manner.

The protein of cheese whey may be coagulated and processed to give a bland-flavored product of smooth consistency. This may be combined with cheese, cream or other food material to add flavor, thus making an appetizing and nutritious spread.

The use of honey in baked goods has been hampered by the difficulty of handling the sticky, semi-fluid honey. Nonfat dry







milk and honey may be combined to produce a free-flowing powder that can be used in the bakery without the losses and other difficulties of handling honey by itself.

The use of sulfuric acid in determining fat in milk is objectionable because of danger to the operation, corrosive action of the acid on plumbing, and cost. The method employing detergents is less expensive, fully as accurate, simple to carry out, and entails no danger of burning the operator or of corroding plumbing. It may be applied to evaporated milk, cream and ice cream as well as milk, and current research indicates that it can probably be used for determining fat in other dairy products.

In spite of a great deal of research on the determination of the total solids of milk by means of the lactometer, the accuracy obtainable with this instrument has not been sufficient to warrant its general use. With the current emphasis on the need in dairy plants for knowing the percentage of nonfat solids in milk as well as that of the fat, there has been a demand for a rapid accurate method of determining milk solids. The new lactometer, which is read in milk at 102° F., gives values quickly on herd milk within 0.1% of those obtained by the time-consuming method of drying the milk in an oven. A metal lactometer, lacking the fragility of the glass lactometer, has been made, but has not yet been tested sufficiently to be advocated for general use.

Research on utilization of milk is being conducted also in many State Experiment Stations and by some commercial dairy organization.

#### Some Current Opportunities for Increased Utilization

Until recently the nonfat dry milk sold in food stores has caked in the package unless it was tightly closed and has been slow to disperse in water. There is now available a non-caking, rapidly dispersible, nonfat dry milk. This should have the effect of accelerating the increase of the use of nonfat dry milk in the home. A similar dried whole milk has not yet been produced; such a product would offer further opportunity for increased utilization.

The manufacture of cheese at less cost, such as by the process previously mentioned, and of cheese of uniformly high quality offers an obvious opportunity for increasing sales and consumption of both the fat and protein of milk.

An evaporated milk which, it is claimed, lacks the cooked flavor commonly associated with evaporated milk, has come on the market on the west coast within the past few weeks. Such a product offers a promising opportunity for increasing the utilization of all the solids of milk through merchandizing in both domestic and foreign markets.





